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EXAMINER	
MOORE, IAN N	

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Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No. 09/687,009	Applicant(s) HARPER, JOHN	
	Examiner Ian N Moore	Art Unit 2661	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *amendment filed on 11-29-2004*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-12,15-17,19-30,32 and 33* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-12,15-17,19-30,32 and 33* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Response to Amendment

1. The indicated allowability of claim 31 is withdrawn in view of the newly discovered references and further interpretation of existing references. Rejections Claims 1-12, 29-30,32-33, 15-17, 19, 20-21, and 22-28 based on the newly cited reference(s) follow.

Claim Rejections - 35 USC § 112

2. The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

3. Claim 1, 15,19, and 20 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 1 recites "**a** node" in line 14. It is unclear whether "a node" recites in line 14 is the same node as "**a** node" recites in line 2.

Claim 15 recites "**a** node" in line 13. It is unclear whether "a node" recites in line 13 is the same node as "**a** node" recites in line 2.

Claim 19 recites "**a** node" in line 9 It is unclear whether "a node" recites in line 9 is the same node as "**a** node" recites in line 2.

Claim 20 recites, "**a** node" in page 6, line 3. It is unclear whether "a node" recites in page 6, line 6 is the same node as "**a** node" recites in page 5, line 2.

Claims 2-12,29-30,32-33,16-17, and 21 are also rejected since they are depended upon rejected claims 1,15,19 and 20 as described above.

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

5. Claims 1-4,6,8-12,15,16,19,20,22,25,32 and 33 rejected under 35 U.S.C. 103(a) as being unpatentable over Soloway (U.S. 5,265,092) in view of Elliott (U.S. 6,456,599).

Regarding Claim 19, Soloway discloses a system (see FIG. 4, a switch 4) for performing route calculations in a link state routing protocol (see col. 3, line 1-8; the system utilizes LSP routing protocol) at a node (see FIG. 1, Switch 4) in a computer network of interconnected nodes (see FIG. 1, Data Packet Switching system; note that each switch in the data network performs computing/processing; thus it is a computer network; see col. 3, line 1-20) comprising:

a processor (see FIG. 4, a combined system of Routing Logic 38 and Forwarding Process Logic 40) operable to evaluate existing routes of the node when new route information is received (see FIG. 2; col. 3, line 13-24; col. 4, line 1-59; note that when there is a change in the network, the LSP packet is received at the switch with newly affected link/route information. The routing logic, according to the LSP routing protocol, permits each switch to determine/evaluate the current/existing routes in the forwarding table), and

recalculate routes and modify a routing table (see FIG. 4, Forwarding table 36) for said node only when said new route information improves existing routes or

existing routes are made worse or lost (see col. 3, line 13-24 and col. 4, line 19-65; note that the LSP packet with the newly affected link/route information is received due to the network topology changes (i.e. a link is failed, a set of operational channels on the link changes, or a new switch is deployed). The routing/forwarding Logic recalculates and modifies/updates the routes in the forwarding table in accordance with the newly affected links/routes to recover/improve/advance the current/existing links routing.)

and memory (see FIG. 4, the combined system of LSP Database 34 and Forwarding Table 36) for storing route information (see col. 9, line 56 to col. 10, line 14), and

upon losing one of the existing routes initializing the process (see col. 4, lines 19-35; when the link is failed, the routing logic is initialized/began).

finding a neighbor node's link information by traversing an LSP (see col. 4, lines 31-45; notifications are send to/from the adjacent switches by sending link state packet, LSP, in order to find/discover the adjacent switch's link information; see col. 4, lines 31-35; see col. 6, lines 34-39).

Soloway does not explicitly disclose determining if new route information improves at least one of the existing routes or at least one of existing routes is made worse or lost; a best cost; calculating a neighbor cost of reaching a node via the neighbor node; and setting the best cost to the neighbor cost if the neighbor cost is less than the best cost. Elliott teaches determining if new route information improves at least one of the existing routes or at least one of existing routes is made worse or lost (see FIG. 4, steps S5-S7; the step S6 and S7 determines whether the routing

message which includes the new link from the potential neighbor optimizes/aligns and improves the existing path/link from the actual neighbor (step S8) or not (Step S10). Note that "not optimizing/aligning/improving" means, the existing link from the actual neighbor is made worse; see col. 9, lines 44 to col. 10, lines 2); upon losing one of the existing routes (see col. 4, lines 25-35); initializing a best cost (see FIG. 3, S5; FIG. 4, S5, S6; when link state update is receive, the optimal low-cost rout evaluation begins; see col. 9, lines 20-25; 44-50; see col. 10, lines 9-25; note that the best for node A to reach Node B is via node C and D);

finding a neighbor node's link information by traversing an LSP (see FIG. 3, S5, and see FIG. 4, S6; receiving/sending cluster beacons (i.e. link state information message) to evaluate potential neighbor node's link state information; see col. 9, lines 44-60)

calculating a neighbor cost of reaching a node (see FIG. 2A, Node B) via the neighbor node (see FIG. 2A, Node C and D; see col. 9, lines 54-63; note that node A evaluates a cost of reaching node B via Node C and D); and

setting the best cost (see col. 9, lines 60-64; selecting/setting optimal low-cost) to the neighbor cost (see col. 9, lines 59-63; a low cost of reaching B) if the neighbor cost is less than the best cost (see col. 9, lines 55 to col. 10, lines 8; 16-25; Node A selects/sets node B's cost as an optimal low cost (i.e. new best cost) since node A evaluates that the cost of node B is less expensive than a cost of reaching node B via C and D (i.e. old best cost)).

In view of this, having the system of Soloway and then given the teaching of Elliott, it would have been obvious to one having ordinary skill in the art at the time

the invention was made to modify the system of Soloway, by providing a mechanism to optimally selecting/setting improved/better low-cost actual links/routes, as taught by Elliott. The motivation to combine is to obtain the advantages/benefits taught by Elliott since Elliott states at col. 1, line 40-64, see col. 3, lines 40-46 that such modification would provide optimally selection/setting of low-cost neighbor nodes based upon cost-of transaction.

Regarding Claim 1,15, and 20, claims 1,15, 20 are a method, a computer program product and system claims which that substantially all the limitations of the respective system claim 19. Therefore, they are subjected to the same rejections.

Regarding Claim 22, Soloway discloses a method for performing route calculations in a link state routing protocol (see col. 3, line 1-8; the system utilizes LSP routing protocol) at a root node (see FIG. 5, Originator ID, Sender, Adjacency information, in the LSP packet; see col. 10, line 57 to col. 11, line 50; note that a root node is the originator of LSP packet) within a computer network, the method comprising:

receiving new route information at the root node (see FIG. 2; col. 3, line 13-24; col. 4, line 1-59; note that when there is a change in the network, the LSP packet is received at the switch with newly affected link/route information);

evaluating changes in state and evaluating routes (see FIG. 4, a combined system of Routing Logic 38 and Forwarding Process Logic 40; col. 3, line 13-24; col. 4, line 1-59; The combined logic, according to the LSP routing protocol, permits each switch to determine/evaluate the changing states in current/existing routes in the forwarding table),

reattaching routes in a spanning tree (see FIG. 2, a routing table of switch 4a consists the Hold-down bit for channel 8a of switch 4d; FIG. 9 step 74-78; col. 3, line 15-41; col. 8, line 12-61; col. 6, line 34-69; note that when LSP/ILSP indicates the affected link, the switch 4a enters the switch (i.e. switch 4d) associated with the affected links (i.e. hold-down bit entry) in the forwarding table/tree. Then, the switch (i.e. Switch 4a) re-computes/re-calculates/reattaches the switches associated with the remaining non-affected links/switches in the forwarding table. Note that a spanning tree is the forwarding table, which is build according to Dijkstra's algorithm.) and re-evaluating routes from reattached nodes (see FIG. 2, List of forwarding channels, hold down bit channel 8a; see col. 8, line 12-60; note that the switch determines/re-evaluates the forwarding table by changing each destination node entry (i.e. hold down bit on that particular channel of the affected links/routes) after receiving a link change LSP due to a failure.) Moreover, in case of a link failure, the routes/links to the source/root node, stored in the forwarding table, are no longer operational; the routing/forwarding logic must re-evaluate and re-compute the existing routes in accordance with the affected links/routes. In the process of recovering/improving the routing, first the logic must cancel the links/routes associated with the affected switches. Then after, the routing logic must re-evaluate and re-compute all routes/links associated with the immediate switches/nodes in the forwarding table); and

upon losing one of the existing routes initializing the process (see col. 4, lines 19-35; when the link is failed, the routing logic is initialized/began).

finding a neighbor node's link information by traversing an LSP (see col. 4, lines 31-45; notifications are send to/from the adjacent switches by sending link state packet, LSP, in order to find/discover the adjacent switch's link information; see col. 4, lines 31-35; see col. 6, lines 34-39).

Soloway does not explicitly disclose sorting nodes with new route information into order of cost; evaluating if existing routes are improved, lost or made worse; reattaching routes at lowest cost point; a best cost; calculating a neighbor cost of reaching a node via the neighbor node; and setting the best cost to the neighbor cost if the neighbor cost is less than the best cost. However, Elliott teaches sorting nodes (see FIG. 4, step S6, perform optimization evaluation) with new route information into order of cost (see col. 9, lines 44-50; the actual and neighbor nodes are optimized/sorted in accordance with the new route message and lowest-cost for routing messages. Thus, the nodes are optimized/sorted into order of cost);

evaluating routes if existing routes are improved, lost or made worse (see FIG. 4, steps S5-S7; the step S6 and S7 determines whether the routing message which includes the new link from the potential neighbor optimizes/aligns and improves the existing path/link from the actual neighbor (step S8) or not (Step S10). Note that "not optimizing/aligning/improving" means, the existing link from the actual neighbor is made worse; see col. 9, lines 44 to col. 10, lines 2;

reattaching routes at lowest cost point (see col. 9, lines 44-67; the link/path from the node with the less expensive or lowest-cost is selected and incorporated into network topology in the routing table); initializing a best cost (see FIG. 3, S5; FIG. 4, S5, S6; when link state update is receive, the optimal low-cost rout evaluation begins;

see col. 9, lines 20-25; 44-50; see col. 10, lines 9-25; note that the best for node A to reach Node B is via node C and D);

finding a neighbor node's link information by traversing an LSP (see FIG. 3, S5, and see FIG. 4, S6; receiving/sending cluster beacons (i.e. link state information message) to evaluate potential neighbor node's link state information; see col. 9, lines 44-60)

calculating a neighbor cost of reaching a node (see FIG. 2A, Node B) via the neighbor node (see FIG. 2A, Node C and D; see col. 9, lines 54-63; note that node A evaluates a cost of reaching node B via Node C and D); and

setting the best cost (see col. 9, lines 60-64; selecting/setting optimal low-cost) to the neighbor cost (see col. 9, lines 59-63; a low cost of reaching B) if the neighbor cost is less than the best cost (see col. 9, lines 55 to col. 10, lines 8; 16-25; Node A selects/sets node B's cost as an optimal low cost (i.e. new best cost) since node A evaluates that the cost of node B is less expensive than a cost of reaching node B via C and D (i.e. old best cost)).

In view of this, having the system of Soloway and then given the teaching of Elliott, it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the system of Soloway, by providing a mechanism to optimally selecting/setting improved/better low-cost actual links/routes and sorts/selects/reattaches routes according to the lowest-cost, as taught by Elliott. The motivation to combine is to obtain the advantages/benefits taught by Elliott since Elliott states at col. 1, line 40-64, see col. 3, lines 40-46 that such modification would

provide optimally selection/setting of low-cost neighbor nodes based upon cost-of transaction.

Regarding claim 2, Soloway discloses receiving a link state packet (see FIG. 5, LSP packet) with information about the node's path to a root node (see FIG. 5, Originator ID, Sender, Adjacency information, in the LSP packet; see col. 10, line 57 to col. 11, line 50; note that a root node is the originator of LSP packet.) and wherein the node's route to the root node is improved (see col. 3, line 13-24 and col. 4, line 19-65; note that the LSP packet with the newly affected link/route information is received due to the network topology changes (i.e. adding a new node/switch in the network). The routing/forwarding Logic recalculates/updates the routes in the forwarding table in accordance with the newly affected links/routes to improve/advance the current/existing links routing.

Elliott teaches wherein the node's route to the root node is improved and further comprising evaluating the node's neighbor nodes (see FIG. 5 and FIG. 9, Steps S31-S42; see col. 9, line 26 to col. 11, line 20; note that a node receives cluster beacons (i.e. link-state updates) message from the neighbors. The node determines/evaluates whether the sender node in the beacon message is already in the routing table. If the sender node is already the actual neighbor, the node stores the sender node ID into actual neighbor table (i.e. the table that stores existing routes/nodes). However, if the sender node ID in the message is not currently in the routing table (i.e. the sender node is newly added route/node), then the newly added sender node ID is added to the potential neighbor table (i.e. the table that stores newly added route/node). Then after, the actual routes and potential/new routes are

compared, and the potential/new routes are added to the actual neighbor table if new/potential routes are better/improved routes than actual/current/existing routes).

In view of this, having the system of Soloway and then given the teaching of Elliott, it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the system of Soloway, by providing a mechanism to optimally select improved/better actual links/routes from potential/new links/routes, as taught by Elliott. The motivation to combine is to obtain the advantages/benefits taught by Elliott since Elliott states at col. 1, line 40-64, see col. 3, lines 40-46 that such modification would provide optimally selection/setting of low-cost neighbor nodes based upon cost-of transaction.

Regarding Claim 3, Soloway discloses receiving a link state packet (see FIG. 5, LSP packet) with information about the node's path to a root node (see FIG. 5, Originator ID, Sender, Adjacency information, in the LSP packet; see col. 10, line 57 to col. 11, line 50; note that a root node is the originator of LSP packet.) and wherein the node's route to the root node has worsened (see col. 3, line 13-24 and col. 4, line 19-65; note that the LSP packet with the newly affected link/route information is received due to the network topology changes (i.e. a link is failed, or a set of un-operational channels on the link) and further comprising evaluating the node's path to the root node (see FIG. 2, List of forwarding channels, hold down bit channel 8a; see col. 8, line 12-60; note that the switch determines/evaluates the forwarding table by changing each potential destination node entry (i.e. hold down bit on that particular channel of the affected links/routes). Also, note that the destination node entries in the forwarding table include the neighbors' switches/nodes.)

Regarding claims 4 and 27, Soloway discloses wherein nodes contained within a subtree containing the node (see FIG. 2, the intermediate switches 4 between end nodes 10; note that the forwarding table in each node/switch contains the intermediate/subtree switches (i.e. neighbor switches)) are scrapped, and the routes to all nodes in the subtree are reevaluated (see FIG. 2, List of forwarding channels, hold down bit channel 8a; see col. 8, line 12-60; note that the switch determines/re-evaluates the forwarding table by changing each destination node entry (i.e. hold down bit on that particular channel of the affected links/routes) after receiving a link change LSP due to a failure.) Moreover, in case of a link failure, the routes/links to the source/root node, stored in the forwarding table, are no longer operational; the routing/forwarding logic must re-evaluate and re-compute the existing routes in accordance with the affected links/routes. In the process of recovering/improving the routing, first the logic must cancel the links/routes associated with the affected switches. Then after, the routing logic must re-evaluate and re-compute all routes/links associated with the immediate switches/nodes in the forwarding table.

Regarding Claim 8, Soloway discloses wherein the computer network comprises greater than one hundred nodes (see FIG. 1, switches 4, and see col. 23, line 50-52; note that the network includes plurality of switches; thus, it is clear that the plurality of switches can be greater than one hundred nodes).

Regarding Claim 9, Soloway discloses wherein said node has lost its path to another node within the computer network (see col. 4, line 25-30 and 60-65; note that the channel failure or a permanent link failure constitutes the losing the link to another switch.)

Regarding Claim 10, Soloway discloses reattaching the node at a location within a remaining portion of a spanning tree (see FIG. 2, a routing table of switch 4a consists the Hold-down bit for channel 8a of switch 4d; FIG. 9 step 74-78; col. 3, line 15-41; col. 8, line 12-61; col. 6, line 34-69; note that when LSP/ILSP indicates the affected link, the switch 4a enters the switch (i.e. switch 4d) associated with the affected links (i.e. hold-down bit entry) in the forwarding table/tree. Then, the switch (i.e. Switch 4a) re-computes/re-calculates/reattaches the switches associated with the remaining non-affected links/switches in the forwarding table. Note that a spanning tree is the forwarding table, which is build according to Dijkstra's algorithm.)

Regarding Claim 11, Soloway discloses recalculating routes to all other nodes in a subtree of which the node is a root node (see FIG. 2; col. 6, line 34-69; note that when LSP/ILSP indicates the affected link, the switch (i.e. Switch 4a) re-computes/re-calculates the links/routes associated with the switches/end-nodes the in the forwarding table. One of the switches (i.e. Switch 4d) is the origination node.)

Regarding Claim 12, Soloway discloses performing an incremental route recalculation for all nodes within the network that have received new link state information (see col. 3, line 13-24 and col. 4, line 19-65; note that routing/forwarding Logic recalculates/updates the routes in the forwarding table upon receiving LSP packet. Also, see col. 7, line 60 to col. 8, line 33; and col. 20, line 31-61; note that routing and forwarding logics in each switch utilizes Dijkstra's algorithm shortest path calculation to compute/construct each route/link for the forwarding table. When applying Dijkstra's algorithm for shortest paths, the algorithm must utilize the

differences/increments/deltas between existing routes and newly affected routes. Thus, each switches utilizes incremental route calculation.)

Regarding Claim 16, Soloway discloses wherein the computer readable medium is selected from the group consisting of CD-ROM, floppy disk, flash memory, system memory, hard drive, and data signal embodied in a carrier wave (see FIG. 4, the combined system of LSP Database 34 and Forwarding Table 36; see col. 9, line 56 to col. 10, line 14; note that the combined system is the "system memory" since it is capable of storing route information.)

Regarding Claim 25, Soloway discloses a root node, and Elliott discloses teaches sorting nodes into the order of nodes and the root node as described above in claim 22. Thus, the combined system sorts nodes in to order of cost from the root node. In view of this, having the system of Soloway and then given the teaching of Elliott, it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the system of Soloway, as taught by Elliott, for the same reason as stated above in claim 22.

Regarding Claim 30, Soloway discloses applying an incremental Dijkstra's algorithm to the root node (see col. 7, line 60 to col. 8, line 33; and see col. 20, line 31-61; note that routing and forwarding logics in each switch utilizes Dijkstra's algorithm shortest path calculation to compute/construct each route/link for the forwarding table. When applying Dijkstra's algorithm for shortest paths, the algorithm must utilize the differences/increments/deltas between existing routes and newly affected routes.)

Regarding Claim 32, Soloway discloses wherein said at least one the existing routes is made worse (see col. 3, line 13-24 and col. 4, line 19-65; note that the LSP packet with the newly affected link/route information is received due to the network topology changes (i.e. a link is failed, or a set of un-operational channels on the link) and further comprising recalculating routes to all nodes in a subtree of the node (see FIG. 2, List of forwarding channels, hold down bit channel 8a; see col. 8, line 12-60; note that the switch determines/re-evaluates the forwarding table by changing each destination node entry (i.e. hold down bit on that particular channel of the affected links/routes) after receiving a link change LSP due to a failure.) Moreover, in case of a link failure, the routes/links to the source/root node, stored in the forwarding table, are no longer operational; the routing/forwarding logic must re-evaluate and re-compute the existing routes in accordance with the affected links/routes. In the process of recovering/improving the routing, first the logic must cancel the links/routes associated with the affected switches. Then after, the routing logic must re-evaluate and re-compute all routes/links associated with the immediate switches/nodes in the forwarding table.)

Regarding Claim 33, the combined system of Soloway and Elliott discloses wherein recalculating routes to all nodes which have received new link state information and processing said nodes in the order of distance from a root node (see Soloway col. 7, line 60 to col. 8, line 33; and see col. 20, line 31-61; note that routing and forwarding logics in each switch utilizes Dijkstra's algorithm shortest path calculation to compute/construct each route/link for the forwarding table. When applying Dijkstra's algorithm for shortest paths, the algorithm must utilize the

differences/increments/deltas between existing routes and newly affected routes.) Elliott discloses processing in increasing order of distance from a root node (see col. 5, lines 34-55; see col. 20-65; see col. 10, lines 35-65; note that the received route messages are processed starting from the lowest cost (i.e. shortest distance or path) from the source/root node. Also, when determining the shortest path starting from the lowest cost or shortest path, one must process in increasing order since the lowest cost or shortest path has already been defined.) In view of this, having the system of Soloway and then given the teaching of Elliott, it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the system of Soloway, as taught by Elliott, for the same reason as stated above in claim 1.

6. Claims 5-7, 17, 21, 23, 26 and 28 are rejected under 35 U.S.C. 103(a) as being unpatentable over Soloway in view of Elliott, as described in above claims, and further in view of Callon (U.S. 5,430,727).

Regarding claims 5, 17, 21, 23 and 28, Soloway discloses all aspects of the claimed invention set forth in the rejection of Claims 1, 13,16, and 20, and further discloses wherein recalculating existing routes comprises implementing equal-cost path (see col. 7, line 60 to col. 8, line 33; and see col. 20, line 31-61; note that routing and forwarding logics in each switch utilizes Dijkstra's algorithm shortest path calculation when computing/re-computing or constructing/re-construing routes/links for the forwarding table. It is also note that when two shortest paths have the same cost, the rout/link is selected based upon the order of the channel address (i.e. tie-

breaker).) The tiebreaker rule is implemented for two equal-cost paths in Soloway teachings. Elliott teaches determining cost of each route as described above in claims 1 and 22. Neither Soloway nor Elliott explicitly disclose equal-cost path splitting or splitting traffic across more than one path if total cost is the same for each of the paths. However, the above-mentioned claimed limitations are taught by well-established teaching in the art of routing and Dijkstra algorithm, which teaches equal-cost path splitting or splitting traffic across more than one path if total cost is the same for each of the paths. In particular, Callon teaches implementing equal-cost path splitting or splitting traffic across more than one path if total cost is the same for each of the paths (see col. 46, lines 50 to col. 47, lines 60; see col. 51, lines 44 to col. 45, lines 22; Dijkstra calculation and forwarding and feature of 10589). Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to assign/implement Dijkstra algorithm's equal-cost path splitting, as taught by Callon in the combined system of Soloway and Elliott, so that it would balance the load in the network; see Callon col. 46, line 55-57; note that by splitting the load over equal cost paths, it would decrease overloading one particular route/link by implementing and assigning equal cost to path/routes and by distributing/splitting the traffic load among equal cost links.

Regarding claim 6, Soloway discloses wherein the new route information improves existing routes and the new route information is used in recalculating routes (see col. 3, line 13-24 and col. 4, line 19-65; note that the LSP packet with the newly affected link/route information is received due to the network topology changes (i.e. adding a new node/switch in the network). The routing/forwarding Logic

recalculates/updates the routes in the forwarding table in accordance with the newly affected links/routes to improve/advance the current/existing links routing.)

Soloway does not explicitly disclose only a parent node sending the new route information is used in recalculating of improved routes. However, Elliott teaches only a parent node (see FIG. 2A, neighbor node A) sending the new route information is used in recalculating of improved routes (see col. 9, line 26 to col. 11, line 20; note that node E receives the cluster beacons (i.e. link-state updates) message from the neighbors A, B, C, and D. According to the beacon messages, node E detects that the data/packet in path node E-D-B is encountering large amount of congestions, and determines that the lesser cost and improve route from node E to node B is by incorporating neighbor node A into the route recalculation.) In view of this, having the system of Soloway and then given the teaching of Elliott, it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the system of Soloway, by providing a mechanism to incorporate the neighbor node into an improved route re-calculation upon receiving a beacon message, as taught by Elliott. The motivation to combine is to obtain the advantages/benefits taught by Elliott since Elliott states at col. 1, line 40-64, see col. 3, lines 40-46 that such modification would provide optimally selection/setting of low-cost neighbor nodes based upon cost-of transaction.

Regarding claims 7 and 26, Soloway discloses all aspects of the claimed invention set forth in the rejection of Claims 1, and further discloses wherein the new route information worsens existing routes and a parent node sending the information is no longer considered a parent node by said node (see FIG. 2, List of forwarding

channels, hold down bit channel 8a; see col. 8, line 12-60; note that the switch determines/re-evaluates the forwarding table by changing and excluding each destination node entry associated with the affected links/routes (i.e. hold down bit on that particular channel of the affected links/routes) after receiving a link change LSP due to a failure. Also, the patent node, a sender node, (i.e. FIG. 1, Switch 4c) sending the LSP packet due to a failure is excluded from the destination node entry in the forwarding table by hold down bits.

Regarding Claim 24, Soloway discloses performing an incremental route recalculation (see col. 3, line 13-24 and col. 4, line 19-65; note that routing/forwarding Logic recalculates/updates the routes in the forwarding table upon receiving LSP packet. Also, see col. 7, line 60 to col. 8, line 33; and col. 20, line 31-61; note that routing and forwarding logics in each switch utilizes Dijkstra's algorithm shortest path calculation to compute/construct each route/link for the forwarding table. When applying Dijkstra's algorithm for shortest paths, the algorithm must utilize the differences/increments/deltas between existing routes and newly affected routes. Thus, each switches utilizes incremental route calculation.)

7. Claim 29 is rejected under 35 U.S.C. 103(a) as being unpatentable over Soloway in view of Elliott, as applied to claim 1 above, and further in view of Spiegel (U.S. 5,649,108).

Regarding claim 29, the combined system of Soloway and Elliott discloses all aspects of the claimed invention set forth in the rejection of Claim 1 as described above. Soloway further teaches each node within the computer network is represented

by a data structure (see FIG. 4, a combined system of LSP database 34 and forwarding table 36; see col. see col. 9, lines 56 to col. 10, lines 12) comprising information about links to other nodes (see FIG. 2, list of forwarding channels for the destination switch 4b-d and end nodes; see col. 8, lines 8, lines 45 to col. 9, lines 49) and cost of the link (see col. 14, lines 56 to col. 15, lines 24);

Neither Soloway nor Elliott explicitly discloses cumulative cost of all links traversed from root to the node. However, Spiegel'108 teaches wherein each node (see FIG. 6A, Node A) is represented by a data structure (see FIG. 6A, Routing Table) comprising the information about the links to other nodes (see FIG. 6A, Source route column) and cumulative cost of all links traversed from root (see FIG. 6A, destination address column) to the node (see FIG. 6A, total accumulative cost for each destination; see col. 10, line 11-50). In view of this, having the combined system of Soloway and Elliott, then given the teaching of Spiegel'108, it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the combined system of Soloway and Elliott, by providing the cumulative cost in the routing table, as taught by Spiegel'108. The motivation to combine is to obtain the advantages/benefits taught by Spiegel'108 since Spiegel'108 states at col. 2, line 24-35 that such modification would provide the best alternative paths by utilizing routing control which combine the benefits of progressive protocol and originating routing protocol.

Second set of rejection

8. Claims 1-4,6,8-12,15,16,19,20,22,25,32 and 33 rejected under 35 U.S.C. 103(a) as being unpatentable over Soloway (U.S. 5,265,092) in view of Corslin (U.S. 5,838,660).

Regarding Claim 19, Soloway discloses a system (see FIG. 4, a switch 4) for performing route calculations in a link state routing protocol (see col. 3, line 1-8; the system utilizes LSP routing protocol) at a node (see FIG. 1, Switch 4) in a computer network of interconnected nodes (see FIG. 1, Data Packet Switching system; note that each switch in the data network performs computing/processing; thus it is a computer network; see col. 3, line 1-20) comprising:

a processor (see FIG. 4, a combined system of Routing Logic 38 and Forwarding Process Logic 40) operable to evaluate existing routes of the node when new route information is received (see FIG. 2; col. 3, line 13-24; col. 4, line 1-59; note that when there is a change in the network, the LSP packet is received at the switch with newly affected link/route information. The routing logic, according to the LSP routing protocol, permits each switch to determine/evaluate the current/existing routes in the forwarding table), and

recalculate routes and modify a routing table (see FIG. 4, Forwarding table 36) for said node only when said new route information improves existing routes or existing routes are made worse or lost (see col. 3, line 13-24 and col. 4, line 19-65; note that the LSP packet with the newly affected link/route information is received due to the network topology changes (i.e. a link is failed, a set of operational channels

on the link changes, or a new switch is deployed). The routing/forwarding Logic recalculates and modifies/updates the routes in the forwarding table in accordance with the newly affected links/routes to recover/improve/advance the current/existing links routing.)

and memory (see FIG. 4, the combined system of LSP Database 34 and Forwarding Table 36) for storing route information (see col. 9, line 56 to col. 10, line 14), and

upon losing one of the existing routes initializing the process (see col. 4, lines 19-35; when the link is failed, the routing logic is initialized/began).

finding a neighbor node's link information by traversing an LSP (see col. 4, lines 31-45; notifications are send to/from the adjacent switches by sending link state packet, LSP, in order to find/discover the adjacent switch's link information; see col. 4, lines 31-35; see col. 6, lines 34-39).

Soloway does not explicitly disclose determining if new route information improves at least one of the existing routes or at least one of existing routes is made worse or lost; a best cost; calculating a neighbor cost of reaching a node via the neighbor node; and setting the best cost to the neighbor cost if the neighbor cost is less than the best cost. Croslin teaches determining if new route information (see FIG. 6a, accumulate cost of the next node) improves at least one of the existing routes (see FIG. 6a, 612, cost threshold) or at least one of existing routes is made worse or lost (see FIG. 6a, Step 606, 610, 612 and 616; see col. 6, lines 55-65; see col. 10, lines 50-67); upon losing one of the existing routes (see FIG. 2, a link failure between A 202

and B 204; see col. 5, lines 25-36); initializing a best cost (see FIG. 6a, step 602, a method for calculating best cost rout begins; see col. 10, lines 40-45);

finding a neighbor node's link information by traversing a message (see FIG. 4, step 404 and 408; Find best route from a next node by sending a message; see col. 10, lines 1-6;49-50;see col. 2, lines 9-30);

calculating a neighbor cost of reaching a node (see FIG. 6a, step 610, accumulate cost) via the neighbor node (see FIG. 2, next node (i.e. Node D); see col. 10, lines 51-54; accumulated cost to destination node (i.e. node C) via next node); and

setting the best cost (see FIG. 6a, 612,616 and see FIG. 6b, 618, 626, 628; new best cost and optimal cost route) to the neighbor cost (see FIG. 6a, accumulated cost) if the neighbor cost is less than the best cost (see FIG. 6a, 616; accumulated cost is less than current best cost; see col. 10, lines 50-67; see col. 11, lines 9-15)). Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to calculating and selecting/setting the best and optimal route, as taught by Croslin in the system of Soloway, so that it would provide a mechanism for dynamically generation routes within a diverse interconnected network and making the route costing an integral part of the process; see Croslin col. 2, line 50-65.

Regarding Claim 1,15, and 20, claims 1,15, 20 are a method, a computer program product and system claims which that substantially all the limitations of the respective system claim 19. Therefore, they are subjected to the same rejections.

Regarding Claim 22, Soloway discloses a method for performing route calculations in a link state routing protocol (see col. 3, line 1-8; the system utilizes

LSP routing protocol) at a root node (see FIG. 5, Originator ID, Sender, Adjacency information, in the LSP packet; see col. 10, line 57 to col. 11, line 50; note that a root node is the originator of LSP packet) within a computer network, the method comprising:

receiving new route information at the root node (see FIG. 2; col. 3, line 13-24; col. 4, line 1-59; note that when there is a change in the network, the LSP packet is received at the switch with newly affected link/route information);

evaluating changes in state and evaluating routes (see FIG. 4, a combined system of Routing Logic 38 and Forwarding Process Logic 40; col. 3, line 13-24; col. 4, line 1-59; The combined logic, according to the LSP routing protocol, permits each switch to determine/evaluate the changing states in current/existing routes in the forwarding table),

reattaching routes in a spanning tree (see FIG. 2, a routing table of switch 4a consists the Hold-down bit for channel 8a of switch 4d; FIG. 9 step 74-78; col. 3, line 15-41; col. 8, line 12-61; col. 6, line 34-69; note that when LSP/ILSP indicates the affected link, the switch 4a enters the switch (i.e. switch 4d) associated with the affected links (i.e. hold-down bit entry) in the forwarding table/tree. Then, the switch (i.e. Switch 4a) re-computes/re-calculates/reattaches the switches associated with the remaining non-affected links/switches in the forwarding table. Note that a spanning tree is the forwarding table, which is build according to Dijkstra's algorithm.) and re-evaluating routes from reattached nodes (see FIG. 2, List of forwarding channels, hold down bit channel 8a; see col. 8, line 12-60; note that the switch determines/re-evaluates the forwarding table by changing each destination node entry (i.e. hold

down bit on that particular channel of the affected links/routes) after receiving a link change LSP due to a failure.) Moreover, in case of a link failure, the routes/links to the source/root node, stored in the forwarding table, are no longer operational; the routing/forwarding logic must re-evaluate and re-compute the existing routes in accordance with the affected links/routes. In the process of recovering/improving the routing, first the logic must cancel the links/routes associated with the affected switches. Then after, the routing logic must re-evaluate and re-compute all routes/links associated with the immediate switches/nodes in the forwarding table); and

upon losing one of the existing routes initializing the process (see col. 4, lines 19-35; when the link is failed, the routing logic is initialized/began).

finding a neighbor node's link information by traversing an LSP (see col. 4, lines 31-45; notifications are send to/from the adjacent switches by sending link state packet, LSP, in order to find/discover the adjacent switch's link information; see col. 4, lines 31-35; see col. 6, lines 34-39).

. Croslin teaches determining if new route information (see FIG. 6a, accumulate cost of the next node) improves at least one of the existing routes (see FIG. 6a, 612, cost threshold) or at least one of existing routes is made worse or lost (see FIG. 6a, Step 606, 610, 612 and 616; see col. 6, lines 55-65; see col. 10, lines 50-67); upon losing one of the existing routes (see FIG. 2, a link failure between A 202 and B 204; see col. 5, lines 25-36); initializing a best cost (see FIG. 6a, step 602, a method for calculating best cost rout begins; see col. 10, lines 40-45);

finding a neighbor node's link information by traversing a message (see FIG. 4, step 404 and 408; Find best route from a next node by sending a message; see col. 10, lines 1-6; 49-50;see col. 2, lines 9-30);

calculating a neighbor cost of reaching a node (see FIG. 6a, step 610, accumulate cost) via the neighbor node (see FIG. 2, next node (i.e. Node D); see col. 10, lines 51-54; accumulated cost to destination node (i.e. node C) via next node); and

setting the best cost (see FIG. 6a, 612,616 and see FIG. 6b, 618, 626, 628; new best cost and optimal cost route) to the neighbor cost (see FIG. 6a, accumulated cost) if the neighbor cost is less than the best cost (see FIG. 6a, 616; accumulated cost is less than current best cost; see col. 10, lines 50-67; see col. 11, lines 9-15)). Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to calculating and selecting/setting the best and optimal route, as taught by Croslin in the system of Soloway, so that it would provide a mechanism for dynamically generation routes within a diverse interconnected network and making the route costing an integral part of the process; see Croslin col. 2, line 50-65.

Regarding claim 2, Soloway discloses receiving a link state packet (see FIG. 5, LSP packet) with information about the node's path to a root node (see FIG. 5, Originator ID, Sender, Adjacency information, in the LSP packet; see col. 10, line 57 to col. 11, line 50; note that a root node is the originator of LSP packet.) and wherein the node's route to the root node is improved (see col. 3, line 13-24 and col. 4, line 19-65; note that the LSP packet with the newly affected link/route information is received due to the network topology changes (i.e. adding a new node/switch in the

network). The routing/forwarding Logic recalculates/updates the routes in the forwarding table in accordance with the newly affected links/routes to improve/advance the current/existing links routing.

Croslin teaches wherein the node's route to the root node is improved and further comprising evaluating the node's neighbor nodes (see FIG. 4, step 402,404,408,410; see col. 9, lines 59 to col. 10, lines 13). Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to calculating and selecting/setting the best and optimal route, as taught by Croslin in the system of Soloway, so that it would provide a mechanism for dynamically generation routes within a diverse interconnected network and making the route costing an integral part of the process; see Croslin col. 2, line 50-65.

Regarding Claim 3, Soloway discloses receiving a link state packet (see FIG. 5, LSP packet) with information about the node's path to a root node (see FIG. 5, Originator ID, Sender, Adjacency information, in the LSP packet; see col. 10, line 57 to col. 11, line 50; note that a root node is the originator of LSP packet.) and wherein the node's route to the root node has worsened (see col. 3, line 13-24 and col. 4, line 19-65; note that the LSP packet with the newly affected link/route information is received due to the network topology changes (i.e. a link is failed, or a set of un-operational channels on the link) and further comprising evaluating the node's path to the root node (see FIG. 2, List of forwarding channels, hold down bit channel 8a; see col. 8, line 12-60; note that the switch determines/evaluates the forwarding table by changing each potential destination node entry (i.e. hold down bit on that particular

channel of the affected links/routes). Also, note that the destination node entries in the forwarding table include the neighbors' switches/nodes.)

Regarding claims 4 and 27, Soloway discloses wherein nodes contained within a subtree containing the node (see FIG. 2, the intermediate switches 4 between end nodes 10; note that the forwarding table in each node/switch contains the intermediate/subtree switches (i.e. neighbor switches)) are scrapped, and the routes to all nodes in the subtree are reevaluated (see FIG. 2, List of forwarding channels, hold down bit channel 8a; see col. 8, line 12-60; note that the switch determines/re-evaluates the forwarding table by changing each destination node entry (i.e. hold down bit on that particular channel of the affected links/routes) after receiving a link change LSP due to a failure.) Moreover, in case of a link failure, the routes/links to the source/root node, stored in the forwarding table, are no longer operational; the routing/forwarding logic must re-evaluate and re-compute the existing routes in accordance with the affected links/routes. In the process of recovering/improving the routing, first the logic must cancel the links/routes associated with the affected switches. Then after, the routing logic must re-evaluate and re-compute all routes/links associated with the immediate switches/nodes in the forwarding table.

Regarding Claim 8, Soloway discloses wherein the computer network comprises greater than one hundred nodes (see FIG. 1, switches 4, and see col. 23, line 50-52; note that the network includes plurality of switches; thus, it is clear that the plurality of switches can be greater than one hundred nodes).

Regarding Claim 9, Soloway discloses wherein said node has lost its path to another node within the computer network (see col. 4, line 25-30 and 60-65; note that

the channel failure or a permanent link failure constitutes the losing the link to another switch.)

Regarding Claim 10, Soloway discloses reattaching the node at a location within a remaining portion of a spanning tree (see FIG. 2, a routing table of switch 4a consists the Hold-down bit for channel 8a of switch 4d; FIG. 9 step 74-78; col. 3, line 15-41; col. 8, line 12-61; col. 6, line 34-69; note that when LSP/ILSP indicates the affected link, the switch 4a enters the switch (i.e. switch 4d) associated with the affected links (i.e. hold-down bit entry) in the forwarding table/tree. Then, the switch (i.e. Switch 4a) re-computes/re-calculates/reattaches the switches associated with the remaining non-affected links/switches in the forwarding table. Note that a spanning tree is the forwarding table, which is build according to Dijkstra's algorithm.)

Regarding Claim 11, Soloway discloses recalculating routes to all other nodes in a subtree of which the node is a root node (see FIG. 2; col. 6, line 34-69; note that when LSP/ILSP indicates the affected link, the switch (i.e. Switch 4a) re-computes/re-calculates the links/routes associated with the switches/end-nodes the in the forwarding table. One of the switches (i.e. Switch 4d) is the origination node.)

Regarding Claim 12, Soloway discloses performing an incremental route recalculation for all nodes within the network that have received new link state information (see col. 3, line 13-24 and col. 4, line 19-65; note that routing/forwarding Logic recalculates/updates the routes in the forwarding table upon receiving LSP packet. Also, see col. 7, line 60 to col. 8, line 33; and col. 20, line 31-61; note that routing and forwarding logics in each switch utilizes Dijkstra's algorithm shortest path calculation to compute/construct each route/link for the forwarding table. When

applying Dijkstra's algorithm for shortest paths, the algorithm must utilize the differences/increments/deltas between existing routes and newly affected routes. Thus, each switches utilizes incremental route calculation.)

Regarding Claim 16, Soloway discloses wherein the computer readable medium is selected from the group consisting of CD-ROM, floppy disk, flash memory, system memory, hard drive, and data signal embodied in a carrier wave (see FIG. 4, the combined system of LSP Database 34 and Forwarding Table 36; see col. 9, line 56 to col. 10, line 14; note that the combined system is the "system memory" since it is capable of storing route information.)

Regarding Claim 25, Soloway discloses a root node, and Croslin discloses teaches sorting nodes into the order of nodes (see Croslin FIG. 6) and the root node (see FIG. 1, Node A) as described above in claim 22. Thus, the combined system sorts nodes in to order of cost from the root node. In view of this, having the system of Soloway and then given the teaching of Croslin, it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the system of Soloway, as taught by Croslin, for the same reason as stated above in claim 22.

Regarding Claim 30, Soloway discloses applying an incremental Dijkstra's algorithm to the root node (see col. 7, line 60 to col. 8, line 33; and see col. 20, line 31-61; note that routing and forwarding logics in each switch utilizes Dijkstra's algorithm shortest path calculation to compute/construct each route/link for the forwarding table. When applying Dijkstra's algorithm for shortest paths, the algorithm

must utilize the differences/increments/deltas between existing routes and newly affected routes.)

Regarding Claim 32, Soloway discloses wherein said at least one the existing routes is made worse (see col. 3, line 13-24 and col. 4, line 19-65; note that the LSP packet with the newly affected link/route information is received due to the network topology changes (i.e. a link is failed, or a set of un-operational channels on the link) and further comprising recalculating routes to all nodes in a subtree of the node (see FIG. 2, List of forwarding channels, hold down bit channel 8a; see col. 8, line 12-60; note that the switch determines/re-evaluates the forwarding table by changing each destination node entry (i.e. hold down bit on that particular channel of the affected links/routes) after receiving a link change LSP due to a failure.) Moreover, in case of a link failure, the routes/links to the source/root node, stored in the forwarding table, are no longer operational; the routing/forwarding logic must re-evaluate and re-compute the existing routes in accordance with the affected links/routes. In the process of recovering/improving the routing, first the logic must cancel the links/routes associated with the affected switches. Then after, the routing logic must re-evaluate and re-compute all routes/links associated with the immediate switches/nodes in the forwarding table.)

Regarding Claim 33, the combined system of Soloway and Croslin discloses wherein recalculating routes to all nodes which have received new link state information and processing said nodes in the order of distance from a root node (see Soloway col. 7, line 60 to col. 8, line 33; and see col. 20, line 31-61; note that routing and forwarding logics in each switch utilizes Dijkstra's algorithm shortest path

calculation to compute/construct each route/link for the forwarding table. When applying Dijkstra's algorithm for shortest paths, the algorithm must utilize the differences/increments/deltas between existing routes and newly affected routes.) Croslin discloses processing in increasing order of distance from a root node (see col. 3, lines 1-6, 45-67 to col. 4, lines 25; the process begins from the short route first, then process to longer route). In view of this, having the system of Soloway and then given the teaching of Croslin, it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the system of Soloway, as taught by Croslin, for the same reason as stated above in claim 1.

9. Claims 5-7, 17, 21, 23, 26 and 28 are rejected under 35 U.S.C. 103(a) as being unpatentable over Soloway in view of Croslin, as described in above claims, and further in view of Callon (U.S. 5,430,727).

Regarding claims 5, 17, 21, 23 and 28, Soloway discloses all aspects of the claimed invention set forth in the rejection of Claims 1, 13,16, and 20, and further discloses wherein recalculating existing routes comprises implementing equal-cost path (see col. 7, line 60 to col. 8, line 33; and see col. 20, line 31-61; note that routing and forwarding logics in each switch utilizes Dijkstra's algorithm shortest path calculation when computing/re-computing or constructing/re-construing routes/links for the forwarding table. It is also note that when two shortest paths have the same cost, the rout/link is selected based upon the order of the channel address (i.e. tie-breaker).) The tiebreaker rule is implemented for two equal-cost paths in Soloway teachings. Croslin teaches determining cost of each route as described above in

claims 1 and 22. Neither Soloway nor Croslin explicitly disclose equal-cost path splitting or splitting traffic across more than one path if total cost is the same for each of the paths. However, the above-mentioned claimed limitations are taught by well-established teaching in the art of routing and Dijkstra algorithm, which teaches equal-cost path splitting or splitting traffic across more than one path if total cost is the same for each of the paths. In particular, Callon teaches implementing equal-cost path splitting or splitting traffic across more than one path if total cost is the same for each of the paths (see col. 46, lines 50 to col. 47, lines 60; see col. 51, lines 44 to col. 45, lines 22; Dijkstra calculation and forwarding and feature of 10589). Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to assign/implement Dijkstra algorithm's equal-cost path splitting, as taught by Callon in the combined system of Soloway and Croslin, so that it would balance the load in the network; see Callon col. 46, line 55-57; note that by splitting the load over equal cost paths, it would decrease overloading one particular route/link by implementing and assigning equal cost to path/routes and by distributing/splitting the traffic load among equal cost links.

Regarding claim 6, Soloway discloses wherein the new route information improves existing routes and the new route information is used in recalculating routes (see col. 3, line 13-24 and col. 4, line 19-65; note that the LSP packet with the newly affected link/route information is received due to the network topology changes (i.e. adding a new node/switch in the network). The routing/forwarding Logic recalculates/updates the routes in the forwarding table in accordance with the newly affected links/routes to improve/advance the current/existing links routing.) Croslin

teaches only a parent node (see FIG. 2, node A) sending the new route information (see FIG. 4, step 408) is used in recalculating of improved routes (see FIG. 4, 410 and 416; best current optimal route; see col. 10, lines 1-14). Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to calculating and selecting/setting the best and optimal route when recalculating/calculating, as taught by Croslin in the system of Soloway, so that it would provide a mechanism for dynamically generation routes within a diverse interconnected network and making the route costing an integral part of the process; see Croslin col. 2, line 50-65.

Regarding claims 7 and 26, Soloway discloses all aspects of the claimed invention set forth in the rejection of Claims 1, and further discloses wherein the new route information worsens existing routes and a parent node sending the information is no longer considered a parent node by said node (see FIG. 2, List of forwarding channels, hold down bit channel 8a; see col. 8, line 12-60; note that the switch determines/re-evaluates the forwarding table by changing and excluding each destination node entry associated with the affected links/routes (i.e. hold down bit on that particular channel of the affected links/routes) after receiving a link change LSP due to a failure. Also, the patent node, a sender node, (i.e. FIG. 1, Switch 4c) sending the LSP packet due to a failure is excluded from the destination node entry in the forwarding table by hold down bits.

Regarding Claim 24, Soloway discloses performing an incremental route recalculation (see col. 3, line 13-24 and col. 4, line 19-65; note that routing/forwarding Logic recalculates/updates the routes in the forwarding table upon

receiving LSP packet. Also, see col. 7, line 60 to col. 8, line 33; and col. 20, line 31-61; note that routing and forwarding logics in each switch utilizes Dijkstra's algorithm shortest path calculation to compute/construct each route/link for the forwarding table. When applying Dijkstra's algorithm for shortest paths, the algorithm must utilize the differences/increments/deltas between existing routes and newly affected routes. Thus, each switches utilizes incremental route calculation.)

10. Claim 29 is rejected under 35 U.S.C. 103(a) as being unpatentable over Soloway in view of Croslin, as applied to claim 1 above, and further in view of Spiegel (U.S. 5,649,108).

Regarding claim 29, the combined system of Soloway and Croslin discloses all aspects of the claimed invention set forth in the rejection of Claim 1 as described above. Soloway further teaches each node within the computer network is represented by a data structure (see FIG. 4, a combined system of LSP database 34 and forwarding table 36; see col. see col. 9, lines 56 to col. 10, lines 12) comprising information about links to other nodes (see FIG. 2, list of forwarding channels for the destination switch 4b-d and end nodes; see col. 8, lines 8, lines 45 to col. 9, lines 49) and cost of the link (see col. 14, lines 56 to col. 15, lines 24);

Neither Soloway nor Croslin explicitly discloses cumulative cost of all links traversed from root to the node. However, Spiegel'108 teaches wherein each node (see FIG. 6A, Node A) is represented by a data structure (see FIG. 6A, Routing Table) comprising the information about the links to other nodes (see FIG. 6A, Source route column) and cumulative cost of all links traversed from root (see FIG.

6A, destination address column) to the node (see FIG. 6A, total accumulative cost for each destination; see col. 10, line 11-50). In view of this, having the combined system of Soloway and Croslin, then given the teaching of Spiegel'108, it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the combined system of Soloway and Croslin, by providing the cumulative cost in the routing table, as taught by Spiegel'108. The motivation to combine is to obtain the advantages/benefits taught by Spiegel'108 since Spiegel'108 states at col. 2, line 24-35 that such modification would provide the best alternative paths by utilizing routing control which combine the benefits of progressive protocol and originating routing protocol.

Conclusion

11. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Ian N Moore whose telephone number is 571-272-3085. The examiner can normally be reached on M-F: 8:30 AM - 5:00 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Ken Vanderpuye can be reached on 571-272-3078. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

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